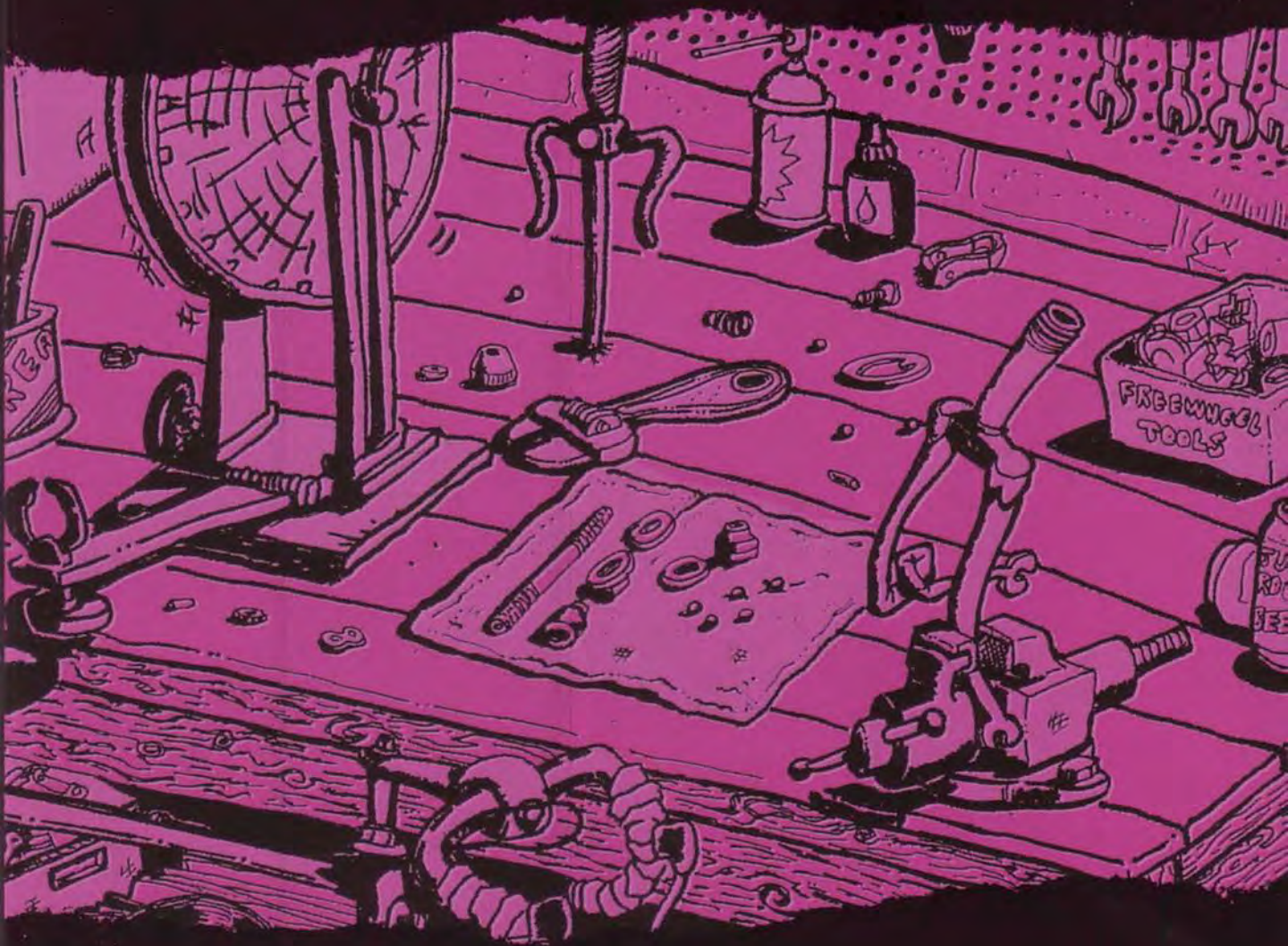
the CHAINBREAKER BIKE BOOK

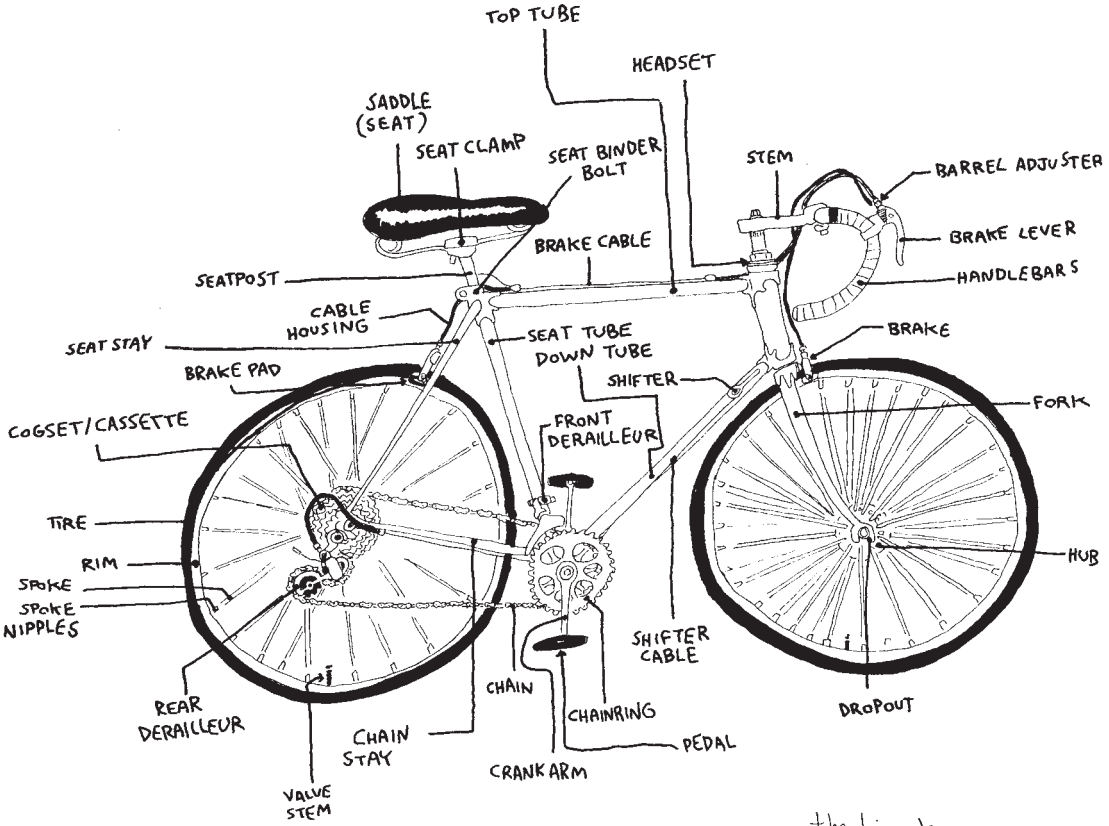


A ROUGH GUIDE TO BICYCLE MAINTENANCE

by Shelly Lynn Jackson & Ethan Clark

THE CHAINBREAKER BIKE BOOK

A ROUGH GUIDE TO BICYCLE MAINTENANCE


TOP TUBE
HEADSET
SADDLE (SEAT)
SEAT CLAMP
SEAT BINDER BOLT
STEM
BARREL ADJUSTER
BRAKE LEVER
BRAKE CABLE
SEATPOST
HANDLEBARS
CABLE HOUSING
SEAT STAY
SEAT TUBE
DOWN TUBE
BRAKE
BRAKE PAD
SHIFTER
FORK
COGSET/CASSETTE
FRONT DERAILLEUR
TIRE
HUB
RIM
SPOKE
SPOKE NIPPLES
SHIFTER CABLE
REAR DERAILLEUR
CHAIN
CHAINRING
DROPOUT
CHAIN STAY
PEDAL
CRANK ARM
VALVE STEM

the bicycle.

THE CHAINBREAKER BIKE BOOK

A ROUGH GUIDE TO BICYCLE MAINTENANCE

by Ethan Clark and Shelley Lynn Jackson.

illustrations by Ethan, Shelley, and Happy

Microcosm Publishing

dedicated to Billy Moss

OWNER OF FRENCH QUARTER BICYCLES
IN NEW ORLEANS

I would like to dedicate this book to Billy, not just for teaching me everything I know about bike repair, but also for taking a chance on hiring me, and for being the constant source of humor & frustration that kept me loving the job for as long as I had it. Billy was a great mechanic and generous shop owner. He was a run over on a beautiful spring day, by a too-big-truck while walking down the street in front of the famous Vaughns Bar, just a block from his home. He was given a jazz funeral fit for a king, attended by every mechanic he ever hired who mattered.

We all love and miss you, Billy Moss.

ISBN 978-0-9770557-3-9
This is Microcosm #76033

First Edition - 4,000 copies - 2/1/2008
Second Edition - 5,000 copies - 9/1/2010

Graphic design & typography: Ian Lynam | ianlynam.com

Microcosm Publishing
222 S. Rogers St.
Bloomington, IN 47404
(812)323-7395

Microcosm hQ Store
636 11th Ave.
Portland, OR 97214
(503)232-3666

www.microcosmpublishing.com

TABLE OF CONTENTS

INTRODUCTIONS 6
- shelley 6
- ethan 6
- what kind of repair manual this is 7
- who this manual is for 9
- a special note for women 9
- diy 10

GETTING STARTED 10
- dealing with a shop 10
- a note on ladies in a shop 11
- description of bike types 11
- purchasing a bike 13
- fit 13
- materials (steel vs. aluminum) 14
- where to buy 14

TOOLS YOU WILL NEED 16
- essential tools 16
- good tools to have 18
- caring for your tools 18
- a word on bike stands 18

TUNE UP INSTRUCTIONS 19
- tune up order 19
- inspection 19
- wheels 19
- inspect wheels 20
- axels 20
- adjustment 21
- overhaul 23

TRUE WHEELS 31
- tubes and tires 31
- how to fix a flat 33

BRAKES 35
- types of brakes 35
- adjusting brakes 37
- how to stop a track bike 41

SHIFTERS 41
- how the shifter functions 41
- types of shifters 41
- friction vs. indexing 41
- a word on gear ratio 41
- servicing your shifters 42

DERAILLEURS 44
- come on baby, don't fear derailleurs 44
- the rear derailleur 45
- the front derailleur 47
- converting to a single speed 50
- troubleshooting 51

SPECIAL CABLE REPLACING SECTION 51
- types of wire and housing 52
- cutting cables 52
- dressing brake housing 53
- ferules and end caps 53
- cable length 53

BEARING SYSTEMS 54
- headsets 55
- threaded headsets 55
  - threadless headsets 58
  - troubleshooting headsets 58

BOTTOM BRACKETS 59
  - different types of bottom brackets 59
  - bottom bracket and spindle widths 59
  - chainline 60
  - adjusting and overhauling 61
  - removing cranks 61
  - bottom bracket odds and ends 63

DRIVETRAINS 69
- chain 69
  - getting the right chain 69
  - when to replace your chain 69
  - removal and installation 69
- freewheels and cassettes 71
  - removal and installation 72
- chainrings 74
- drivetrain troubleshooting 75

CHECK ALL NUTS AND BOLTS 76
- safety check 76
- seats 76
- seatposts 76
- pedals 78
- testride 79

THE RANDOM AND (HOPEFULLY) HELPFUL INFORMATION SECTION 79
- wrenching tips 79
- general troubleshooting 81
- care and maintenance 82
- locking your bicycle 82

SAFETY TIPS FOR RIDING 83

STUFF 86
- getting parts 86
- accessories 86
- need vs. want 86
- fancy stuff 87
- bike aesthetics and fashion 88

CLOSING STATEMENTS 89

APPENDICES 90
- directory of community bicycle projects 91

GLOSSARY 97

REPRINTS OF OLD CHAINBREAKERS 99-215

INDEX 217

ABOUT THE AUTHORS 221

introductions:

shelley

I haven't been a "professional" mechanic for a couple years now. The shop I worked at in the French Quarter in New Orleans for about 6 years closed a few months before Hurricane Katrina hit. Now, I have lost my wrench-turning calluses and a bit of memory for what it feels like to work on all different bikes in a shop, day after day. My bike fixing experiences were at a shop that worked on virtually no fancy bikes, and at Plan B, a volunteer-run space for bike recycling. At the shop it seemed like the tools we used most were hammers and drills, and at Plan B we struggled to keep functioning components stocked as we pieced together bikes with mismatched, used parts. But, at both places, we worked so hard to make things work well and to provide people with a solid form of transportation. We learned a lot more about bikes doing things the way we did. It was way more than just take off and replace, like most things in the modern world. We worked really hard to make even the jankiest of bikes run pretty well. Because of this, I will never forget how to be a mechanic. It is like learning to ride a bike, I suppose. Once you got it, you got it for life. This is my attempt at sharing the little useful bits of bike repair that I learned over those years.

This repair manual is slightly limited and maybe even a little old school for the type of bikes that are on the road these days. At the very least, what this manual covers is the basics of mechanics and repair, a starting point for a person who wants to learn to work on their bicycle. At best, it is inspiration for learning to look at your surroundings in a whole new way, because what I want to express here is not simply how to make a broken bicycle work again, but how to make anything broken work again. So that you feel like you can look at a problem and not just not feel daunted by it, but to actually feel inspired by it, to see every problem as an opportunity to learn something new and useful. I mean, we live in a world full of impermanence. It is the law of nature that the things around us, tangible and intangible, change and sometimes fall apart. Embrace it! Learn to look at problem solving in a whole new way.

Honestly, I believe it was moving to New Orleans and getting myself on a bicycle that really made a huge positive change in my life. Riding around this beautiful city helped me slow down a little. Having a bike in a place that I loved led to being alone and independent for the first time in my life. That was a small act that completely reshaped my future. I escaped the car bubble culture I had grown up with in Southern California. I was suddenly able to experience and interact with the outside world in ways I hadn't. I smelled the plants around me and began to notice the houses and architecture that made up my surroundings. Life became more engaging as I interacted more. Slowly this inspired the way I prioritized my life, and I began questioning my needs versus my wants and simplified so that I could spend more time doing things that felt fulfilling. The seed for all of this was a simple, little bicycle. Being a bicycle mechanic and actually learning about how they work and how to fix them, took all of this a step further. Getting to work on my own bike gave me a chance to learn things, to become more capable.

Think about it, just a simple machine like a bicycle can help you find simplicity, capability, and the genuine desire to live life to the fullest. Hopefully that inspires others to live their lives this way as well.

ethan

In all honesty, I'm not as into bikes as I used to be. Once was a time when my world revolved around my bike, (a pink Tommassini that I found in a dumpster in Boulder,Colorado), my courier bag, my little pouch of tools, my leatherman, my pump, my Nalgene bottle. That was about all that I owned, and I thought of myself as a little rolling autonomous zone—ready for anything. This was in New Orleans, where the ground is flat and the roads are bad and biking just makes more sense. There, it seemed that after food, a bike was the most important thing you could have. I hurled myself into cycling; working with Shelley at French Quarter Bikes, and volunteering at Plan B, the New Orleans Community Bike Project, where we helped people fix up bikes out of recycled parts. Eventually, I decided to take it a bit further. I went to frame building school in Ashland, Oregon, then moved to Asheville, North Carolina, with the intent of working at a fancy bike shop where I would learn about more high end gear. I made a resume in comic strip form, got a list of the bike shops in

town from the yellow pages, and set out, in the snow, to get a job. The first place I walked into was a bike/ski shop, an REI-type outdoorsy outfitter place, the kind with happy families of mannequins in khaki shorts rappelling down the walls. "This place is not going to hire me." I thought as I handed my resume over to the mustachioed golden-boy manager. But they did. I finally got to work with super-fancy, high-end parts. And you know what? It sucked! I hated it. All day long I dealt with cyclists, mostly either mountain bikers or racers. I adjusted shocks and disc brakes; I upgraded forks and put together titanium road bikes. It felt like I was on a different planet than when I was helping people with bikes they needed for getting to work. I didn't care about some accountant's three thousand dollar mountain bike! I wanted to be straightening bent forks on forty year old Schwinns! I'd gotten into bikes because I thought that they were empowering. Bikes give people self-reliance, but the high end bike shop tries to take that away. Funny thing about capitalism; how that works. Like I said, I'm not as into cycling as I used to, but I still have the utmost of respect for the bicycle. It is the most efficient machine on earth, and in a world that's so full of crappy things, finding something like a bicycle, which is about as close to purity as you can get, is a life-changing thing. So when Shelley asked me to help with this book, I jumped at the chance. I may not be who I used to be, the guy that actually planned, once upon a time, to have "Bike Ride" tattooed on my knuckles, but I still wanted to share what I know about bikes and maintenance before it leaves my increasingly sieve-like memory for good.
Ok, on to mechanics!

what kind of repair manual this is:

This manual can serve many people, from the very beginner to a decent mechanic who just likes to geek out and hear people talk a lot about bikes and turning wrenches. If you know everything in here already, or this seems too simple for you—that's great! Find a more advanced manual!
You can take bikes as far as you want to, and with some attention and logic, the bikes this manual will help you fix should take you as far as you want to go.

Also, this manual is not written in high tech or "cool dude" language. It is written in the language we would be speaking in if we were standing in front of you. It is meant to help you identify what you are looking at and make it easy to think logically about what each part does and how they work together. It will help you locate a part on your bike even if it looks a little different than the ones in our illustrations. For me, I can look at most car engines (old ones) and find a carburetor, distributor, alternator, etc., and though they sometimes look radically different from car to car, by understanding each part's form and function I can troubleshoot the reason it may be malfunctioning. Doing this with a bike is way easier than with a car, and you shouldn't have a problem if you open your mind to it.

For some, certain descriptions may be difficult to grasp. If mechanics are new to you, then, start with simple things to get you familiar with tools, the way they work, and with the way your own hands work. Start with fixing a flat, or adjusting your seat height. Or do something with a friend who can show you a little first. Or wing it! That's how I learned. Eventually, after some time and a lot of mistakes, I think I got it. So please, be patient with yourself. Sadly, no repair is problem free and there always seems to be a catch. From rusted-on nuts, banged up threads, to wrong tools, and wrong parts, or maybe we just don't cover how to fix the exact kind of part on your bike. Things will happen. Difficulties will arise. Just be patient and logical, and with your own ingenuity and a little guidance from this book, I think you can work it out.

There are a few basic things that bikes should be—functional, practical, simple, and if you're so inclined—pretty. For some people, these things are prioritized differently. That is fine. But with this book, we'll start at the top. You'll learn first how to make your bike functional. Making it pretty is up to you, but we'll give you a few tips on that too. The book is based around a full maintenance tune–up. It is set up to help you keep everything on your bike functioning well to help prevent larger problems that could come up from basic neglect. Lack of maintenance and attention leads to problems whose solutions are too difficult to handle in a simple repair manual like this one, leaving you dependent on some stranger to fix things for you. That ain't cheap. The preventative maintenance required to avoid this is actually quite easy.

HI! MY NAME IS ETHAN CLARK, I'M A BIKE MECHANIC FROM NEW ORLEANS WHO RECENTLY MOVED HERE.
FROM MARCH OF 2002 TO TO DECEMBER, I WORKED AT THIS PLACE, FRENCH QUARTER BIKES. SHELLEY JACKSON (WITH THE WHEEL) IS THE MANAGER. SHE CAN BE REACHED AT
I WAS JUST RIDING ALONG AND..
522
FROM OCTOBER 2001 UNTIL NOVEMBER '04 I WAS THE CO-DIRECTOR OF THIS PLACE...
PLEASE PUT TOOLS BACK WHERE YOU FOUND THEM!!
RAGS
...AND THIS SCREW ADJUSTS THE LOW GEAR.
SIDE PULL
CENTER PULL
PEDAL
...THE NEW ORLEANS COMMUNITY BIKE PROJECT. IT'S A NON-PROFIT, 501C3, ORGANIZATION THAT HELPS FOLKS REPAIR THEIR BIKES, PROVIDES TOOLS, TEACHES KIDS AND SELLS AFFORDABLE, RE-CYCLED BIKES AND PARTS. YOU CAN CONTACT CO-DIRECTOR HOPE AMICO AT BLAH BLAH...
...AND IN MAY OF 2004 I ATTENDED UNITED BICYCLE INSTITUTE'S CROMOLY BRAZING FRAME-BUILDING COURSE.
FINDING JOBS IN A NEW TOWN IS ROUGH, AND I'D BE PRETTY BUMMED TO TRADE MY WRENCHES IN TO, SAY... WORK AT WAFFLE HOUSE OR SOMETHING. SO IF YOU NEED A MECHANIC, PLEASE CONSIDER ME! THANKS!
YOU CAN REACH ME AT:
Blah Blah blah...

who this manual is for:

We want this book to be accessible to everyone! For women and men, the wealthy and to those who live life by simpler means; all races, ages, abilities and strengths. It may seem obvious that bikes would be accessible to all types of people, but sadly, this is not always true.

In America at least, we are brought up in a competitive world, with surroundings steeped in capitalism and consumerism. It makes it difficult to know what our needs are. From a young age most of us looked forward to getting our first car, our driver's license. Most of us are taught to look forward to success in our lives: getting married, acquiring things, buying things. Our whole world is shaped by the idea of supply and demand, to think that if we can get anything we want, that it is not wrong to get everything we can. But, we will assume that for many of you interested in bicycles may be longing for a simpler life. Hopefully we can create one by learning from the faults of the macrocosm and not making the same mistakes in our microcosms. There is no need to impose the competition, greed and caste systems of the rest of the world into our lives and communities.

I know it is natural for humans to break themselves down into groups, recognizable by dress, mode of transport, musical tastes, hairstyles. We like to be around people who look like us because we assume they have similar belief systems. This is not always true. Try not to create barriers between you and the people around you. Maybe this seems a silly topic for a bike repair manual, but we have seen plenty of sexism, racism, and competitiveness between people over who has the coolest shit in the biking scene. This is just silliness. Maybe you have cooler stuff, but why? Cause you worked harder and spent more money? Because you don't work and have hours upon hours each day to go dumpstering and scavenging all over town? Never seen a woman totally kick ass as a mechanic? Well, just so you know, there are a lot of ladies out there who could teach some boys a thing or two. The bottom line is: it's not a competition. Everyone and every bike is allowed in, ok?

So while this book was made by a couple punks, one under thirty and one who likes to say she's pushing 40, it was made with the intention that anyone should have access to it! Help us do all we can, with our limited abilities, to make sure lots of people from all over the place get a look at this so they may learn something that can help them make a repair or want to get and ride a bike. Spread the word with us about how great and simple bikes are and all the great things they do for our lives, and we can help make our little bike scene a big, colorful, eclectic bike scene. Thanks.

a special note for women:

Ok ladies, this is a little pep talk for you. I know it can be difficult at first to pick up a new skill, especially one that is often thought to be a man's thing. My (Shelley's) first job ever was selling tools in a hardware store, and it was the first time I experienced the kind of blatant sexism that would just bring me to tears, the kind that would follow me through many jobs ever since. It was worse at the bike shop, where I was often spoken down to, called sweetie, and asked if I need help lifting something. Sometimes it was out of kindness, cause in the south, everyone called everyone sweetie, even when they're calling the cops on you. But there were times when I was assumed to be the wife of the owner, or spoken about to the owner as if I wasn't in the room. Things like, "She can fix stuff?" spoken to my boss as I was working a bike on the stand.

The same kind of shit comes up whether we are working in a shop, in a free bike project, or working with a guy friend in the garage. It is easy to get a little nervous, shy, or frustrated when the person trying to teach us to fix something, or the person whose bike we are trying to fix, keeps taking the tools from our hands and doing the work for us (I am guilty of doing this myself). It is your job to stand up and be heard. Know what you want to learn, get to know the tools, the language, and by all means, do the wrenching yourself, even if it means making mistakes. Ask questions and look for guidance, but look to your own sense of logic as well. I often find women to be more attentive and careful of their work, unlike a lot of bolt-breaking dudes I have worked with. Trust yourself and your work. If things get out of hand and you are feeling left out or condescended to, speak up, and let the person know you are totally capable of doing what you are meant to be doing. Keep up the hard work, and don't back down. You'll be happy about it in the end. I know I am. Empower yourself, and by all means, don't stop there, learn to be patient to help empower others as well! Let's hear it for the girls!!!

diy:

The Do-It-Yourself culture started way before the punks. People have always loved learning how to be better in touch with their surroundings by problem solving life's inevitable breakdowns and becoming proactive in keeping their world functioning. It is great to learn how to fix a leak in your plumbing or not have to pay some stranger to do a simple oil change on a vehicle. Learning to do it yourself aids in a lifestyle where one does not have (or want) a forty-hour work week. You can learn to get by on less by having to pay fewer people to do things you can easily do yourself. It is a great thing. When we learn how to fix things, our relationship between time and money shifts and our appreciation for the great, well functioning things in our lives grows.

I remember when I was working on fixing a friend's house for seven dollars an hour. When my truck broke down, I couldn't go pick up sheetrock for the walls. I had two choices: take the afternoon off and lose twenty one dollars in pay and go to the auto parts store, pick up the part and change it out on the truck in fifteen minutes or, take the afternoon off, drive down to the auto shop and pay some stranger sixty dollars an hour (minimum one hour!) to do it for me. Then wasting more time the next morning picking the darn thing up (if it was finished by then!). Duh! My time is money, but in this world, another person's time usually costs a whole lot more. The reasons we work on our bikes extend far beyond saving a buck, just as they are for most folks who like to do things themselves. Yes, we do it because it makes good economic sense, but mostly we do it out of love and because we wouldn't have it any other way!

On the other hand, there are also times when we just don't want to do the work. Maybe you are busy or just don't like mechanical stuff. Like when I changed the clutch in that same truck. Three days of struggling to get my transmission in and by the end of it, I wish I had shelled out the two hundred bucks to have someone else do it—though, secretly I was proud and happy that I did. While bike repair is almost never THAT difficult, not doing it yourself is ok too! It comes down to knowing your limits. Knowing how far you are willing to go and or how much time you can or are willing to invest. Not everyone needs to know how to fix a bike, or hang sheetrock, or fix a toilet! Do what feels right to you, and never make fun of someone who just wants to take her or his bike to a shop. Instead, offer your time to do a repair for them, send them to a good shop or steer them away from a crappy one. Best yet, offer to teach them how to fix their bike. But let the person go to a shop if they want, and allow yourself to do it too sometimes. Just understand the trade-offs. When you decide to pay someone else, do it with joy, pick a nice shop and treat your mechanic well. Good shops need our support too.

getting started.

dealing with a shop:

Even an experienced mechanic will sometimes have to rely on a shop for advice, parts or accessories, especially if you live in town without a bike co-op or other type of free bike, or recycled bike space. So the best thing you can do for yourself is find a shop close to you that you can trust. The best way to do this is first to choose a shop that fits your needs. Every bike shop is different, from the employees, to the main sales of the shop, to the goals of the shop, etc. It is good to look at all of these things and find one that is good for you. Find a shop where you can communicate with the people working there. If you love fancy bikes and riding long rides on the weekends, find a shop that caters to that type of bike and maintenance and see if they have group rides you can go on, or a team or something. If you are into single speeds, or beaters, find a smaller shop where the people might be more attentive to your bike type, and who can give you good advice that will save you money. Either way, try to find one shop you like and stick with it. Buy your tubes there, tools, accessories, everything.
Once you have found a good shop, try to get to know the mechanics and build a good rapport with them. When you take your bike in for a repair, ask what they did, what parts they used. If they seem really receptive, ask if they could show you what they did and see if they will give you any pointers on doing the repair yourself. Some shops are simply too busy for this, or don't like to do it out of fear of losing a customer. But some will, and a mechanic just might help out a fellow biker now and then. These kinds of mechanics are priceless, and should be given tons of love and respect. They usually like a little interaction with a

dedicated and self-reliant biker and will give you time when they can. If they love questions, ask them, but be respectful of their time and be sure not to step on their boss's toes if they happen to be around, in which case, laying a little low might be the best thing to do. I know where I worked we had real regular customers. I got to know their bikes, the type and quality work they expected. If they were really sweet, a struggling musician, or tipped me regularly, I would do little things on the side to make them happy, like tightening up a janky basket or doing a quick brake tightening for free if I was fixing a flat; little things to make them happy and keep them coming back. Being bitchy to your mechanic, condescending, or low-balling them on prices will not make you a popular customer. You don't want to piss off the person fixing your bike any more than you want to piss of a waiter alone in the kitchen with your food. You know what I mean? The mechanic might just do something crazy, like fill your seat tube full of bb's (just kidding)! I have never been so extreme as to be negligent of a bike, but I have sure been known to leave the pain in the ass for last if I had a list of stuff to get done. But treat your mechanic right they will hook you up!

If you do find a great mechanic who understands your needs, do NOT for any reason ask for hook-ups or special favors in front of their boss. You can't assume every worker is on the same page as the boss. Don't get anyone in trouble or cast any doubt on them in the eyes of their employer. That happened to me quite a bit and it did nothing but make my boss paranoid that I was trying to rip him off; which I never did. So take care of those who take care of you, keep it on the down-low.

a note for ladies in shops:

It is really difficult being a woman in a bike shop sometimes! Seriously! Sadly they are often very male spaces, and no matter how tough you look, walking into a shop can make a woman feel 15 again. So ladies, be forward, be assertive. You don't have to spout off a bunch of stuff about components or high end shit to get the respect you deserve. If you ride a crappy little three speed and you want to know why the brakes aren't working, ask the mechanic to show you why and where they are broken. That's actually how I got my job at the bike shop! Don't be afraid. If the male mechanic calls you sweetie, or honey,

counter him with a straight-forward "sir", which draws a nice boundary and can diffuse annoying flirtation. Let him be sure the interaction is about bikes and nothing more. You can do it! Find a shop where the mechanic treats you like a customer, not a female customer. Better yet, seek out a shop with a lady mechanic. By the same token, don't think you are getting ahead by using your femininity to get extra attention. It might make you feel like you are in control, but in reality, you are just selling yourself short by playing into stereotypes.

description of bike types:

Of course the type of bikes one sees in their own city varies from place to place because of the terrain and economics of the town. Here in New Orleans, we mostly used to see big clunky single speed cruisers with coaster (kick back). Recently, I think due to an influx of folks from single-speed towns like Minneapolis and Portland, we see many more racing bikes converted to single speeds; a perfect bike for

our city. How do you choose? Think about what you want to do with your bike and get something appropriate. Don't just get the hippest thing for fashion's sake. Ask yourself:

What kind of riding do you do? Are there a lot of hills where you live? Do you bike a long distance every day? Do you carry a lot of stuff, or move heavy things frequently? Is your bike for recreation or transportation? These questions will help you choose an appropriate bike for your town and your lifestyle. This list will help you figure out what kind of bike is best for the riding you do.

CRUISER: this is the single-speed, heavy-duty sit-up-straight style bike. In California we called them beach cruisers; in New Orleans we call them truck bikes. Cruisers have wide tires, wide seats and are often weighted down by fenders, chain guards and wide or tall handle bars. Schwinn made great ones, Murray made decent ones, and Huffy made some pretty crappy ones. New retro cruisers are making a comeback and even come with "distressed" paint to get that old school look that folks love these days. These are great bikes for big baskets and lots of hauling. Not so good for uphill riding. I ride my dog around on mine!

THREE SPEED: these were most popular in the '70s and '80s and were made popular by department stores. They are lighter than cruisers, usually have internally geared hubs and dove bars. These are great bikes and it isn't hard to find a good old one in nearly mint condition. Tunes up well and are surprisingly fast, and when the hub goes, it's easily converted to a nice light single speed with a coaster wheel. These are strong and generally faster than cruisers. They'll hold a fair amount of weight too....

ROAD BIKE: light bikes with multiple gears (10-27), drop bars and made, in most cases, with either steel or aluminum. Built for racing, but used by commuters and weekend distance riders. Road bikes can be the fastest, but with the thinner tires and drop bars, they're not for everyone. These are the bikes that are often very easily converted to single speeds for flatter terrain. You can mount a good rack on the back of them for transporting light stuff.

TRACK BIKE: These were built for riding on a, um, track. They are light, road style bikes with one gear cog in the front and one in the rear. Unlike single-speeds, which have a freewheel in the back, track bikes have a fixed cog which prevents the bike from coasting, so if the wheels are turning, so are the cranks—pedaling all the time. These are popular with bike messengers, and are most easily recognized by the lack of brake levers. They are meant to be light and simple with no derailleurs, no brakes, cables, or shifters and almost never having anything extra like racks or baskets—though it has been done.

MOUNTAIN BIKE: mostly straight-framed bikes with larger knobby tires and multiple gears (usually 18-27). They usually have straight handlebars with low stems for a more aggressive ride, often with front and/or rear suspension shocks. The knobby tires slow you down a bit in the city, but can be switched out for slicks, unless you ride in dirt or grass or off-road a lot. Suspension complicates baskets and racks.

CROSS BIKE/HYBRID: similar looking to mountain bikes, only suited more for commuters. Often with cushier seats, slicker street tires (on narrower 700c wheels), higher handlebars and stems for a more upright position. Some have shocks, or seat post shocks. Hybrids were almost the perfect city commuter bike until most companies switched to only comfort bikes.

COMFORT BIKE: These are pretty new school as far as I can tell. I think I was working at French Quarter bikes when the big switch happened and most companies left out the hybrid and got these. They are similar also to mountain bikes, usually have wider but slicker tires. They often come with shocks on the front forks and seat posts, and wide seats. They usually have very high adjusting handlebars and stems and are actually very comfortable. However, they are slower than hybrids, as well as more complicated for basketing (due to the shocks), which I think is pretty important for a commuter.

BMX: short dirt/street/jump/trick bikes, usually with 20 inch wheels and tiny frames. Fun for tricks, but a little difficult for transportation riding, though Ethan used to know a maniac who couriered on one.

purchasing a bike:

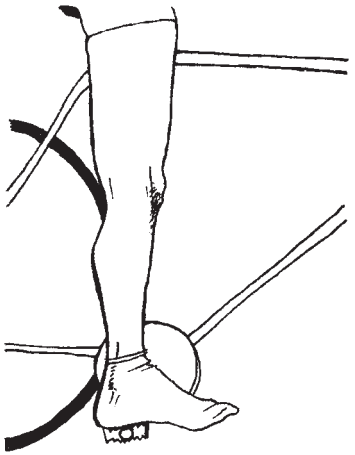
fit:

Mistakes in fitting can make even the best bike feel crappy to ride. So often I see people riding around on bikes that don't fit them, or are just not adjusted properly to their size. It is important, when buying a bike, to get one that fits you! This means buying a bike that can be adjusted to fit you as well as possible. You don't want to hit your knees on the handlebars when you ride, or struggle to reach the pedals. At a good bike shop, the salesperson should help you find the best size for you. At a department store they won't, and when buying a used bike it will really be up to you. Test riding a bike helps. Be realistic when you do this. A few years back, I was given a great used road bike converted to a single speed that I absolutely loved. It wasn't until I switched to another bike that I realized I had been riding a bike way too big for me. I could reach the pedals while riding, but couldn't stand over the thing at a stop, which can be pretty dangerous in the wrong situation. The next thing you know you're goin' around showing everyone your bruised privates.

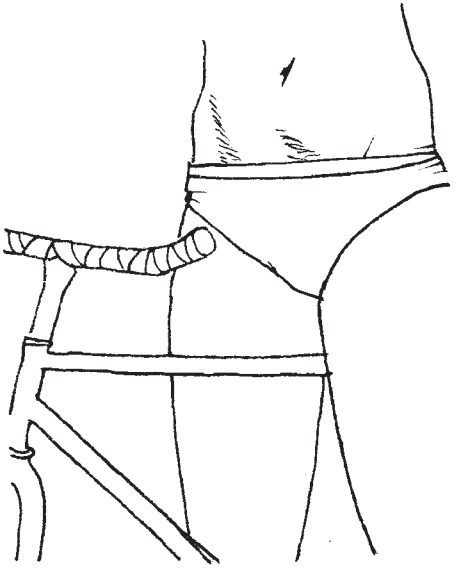
Bikes are built for different heights and also different lengths. Height can be adjusted within limits, by raising or lowering your seatpost. Length can be adjusted, within limits, by adjusting your seats rails on the seat post and by the length of the stem you use. Check that your seat post clamp is on correctly with the clamp behind the post, otherwise your seat could be in front of the bottom bracket, which is weird. There is lots of geometry and math involved, but for now we'll start out with this:

Height: (ground to seat) You should be able to fully straighten your leg while pedaling, and also stand flat footed (with none of your parts touching, y'heard?) over the bike's top bar when stopped. This can be complicated when trying on ladies frame bikes, or these new, slopey "unisex" frames and frames with compact geometry. Some difference can be made up by adjusting your seat height. By loosening one bolt, you should be able to slide the seat post up or down. It shouldn't bottom out or be raised past the little dashy lines on the post, which denotes the safe height level.

Length: (seat to handlebars) This one is a little trickier. I think it is up to how you feel on the bike with the awareness of the



fact that there are in fact, different lengths to choose from. One shouldn't feel cramped for space, or like you are really stretching and reaching for the bars. Try rides on different bikes to experience the differences and to see what your preferences are. Mountain bikes and especially road bikes can feel really different when comparingdifferent lengths. And again, you can change stem length and seat position to make up minor problems. There are instructions on raising or lowering seat and stem height later in this book.



materials (steel vs. aluminum):

Bike frames are made of all kinds of materials. Aluminum, steel (chromoly that is, a low alloy steel which is lighter than steel, but not as light as aluminum), carbon fiber, wood, bamboo, you name it. This is a good thing to think about when you are choosing a new bike, or building one up from a bike recycling shop. Lots of people ask about the differences between steel (chromoly) and aluminum and it is really pretty basic. Aluminum is light but stiff. It is more brittle and less forgiving. It is great if you have to carry a bike up 4 floors of steps, but it can be a little tough on the booty, meaning—it rides a lot bumpier. I love old steel frames. They ride softer and smoother and are welded strong, and if you build them right, you can keep them light. Using aluminum (often referred to as "alloy"when talking components and wheels) components (rims, cranks, pedals, seatposts, handlebars, seats with aluminum parts) will keep them light and you'll be happy. With steel, just be sure to take care of your frame. Try not to nick up the paint a lot with posts or locks, and keep surface rust down by an occasional cleaning with soapy water and one of those little green scrubby pads or soapy steel wool. Be gentle with the steel wool; go light on the paint. As far as other materials go, you could spend big bucks on a light carbon fiber frame, but if you've got that kind of dough, you might be better off spending it on a good, custom built steel frame from an independent frame builder. There are lots of great ones out there who would love the business, and this way you'll be spending the same amount of money, only you'll be putting it in the hands of a craftsperson instead of a corporation. And it will fit you perfectly.

where to buy:

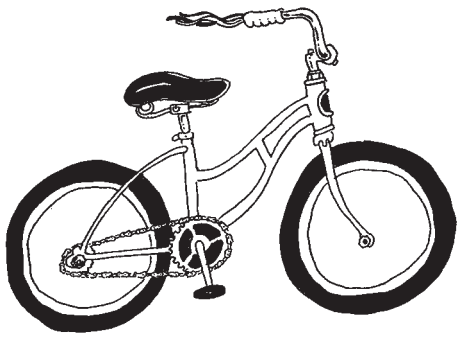
There are lots of places a person can buy a bike—small independent shops, department stores, from the newspaper or off some internet classified, yard sales, a friend, a bike recycler (like many of the community bike shops listed in the back of this book), or even from a thief off the street. As with any purchase, spend your money consciously. Think about who you are giving your business to. Bike projects are great because you can always go back and learn to maintain the bike yourself. Independent shops offer warranties and the opportunity to build a good relationship with the shop. Yard sales and friends are good because you can get some great deals, especially if you know how to make simple repairs. But, buying a bike that might be stolen is not good, for you, your karma, or for the person who got their bike jacked. Don't do it, no matter how tempting....

IF AT ALL POSSIBLE DO NOT BUY WAL-MART OR DEPARTMENT STORE BIKES! This might sound like some kind of elitist or classist crap that implies that one bike is better than another. I don't mean it that way.... All bikes are great, no matter what, but let me explain: The vast majority of large label bikes are made in China and we all know China doesn't have the best track record on human rights or great labor laws. This is true for department stores and for most independent bicycle shops. Buying a Chinese bike is difficult to avoid unless you are planning to spend big bucks on a new, hand-built bike by an independent builder. The best way to avoid buying a Chinese bike is to buy a used bike, therefore giving your money to a person, not to a specific company. But buying a Chinese bike is not the only issue here.

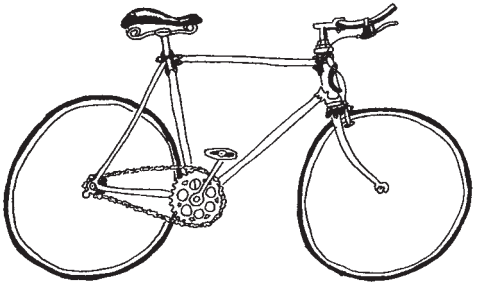
Once upon a time, during the six year stint at the bike shop in the French Quarter, our small shop was located far from any department store, in a time when New Orleans still tried to keep "big box" department stores out of the metro area. One actually had to go quite far to get to one. Our customers were transportation riders (rode less than 5 miles a day and generally did all of their chores by bike because they didn't own a car) or food deliverers. They were loyal to us for repairs, and many of them came to us regularly for a new bike for fun, or because theirs was stolen. Our shop did well with sales and really well with repairs and the work was fun and rewarding—then Wal-Mart came. It moved less than two miles from the French Quarter and our business changed radically. Regular buyers started coming in for regular repairs on bikes that were:

1) Impractical: mountain bikes with front shocks, making it impossible to put front baskets on; with knobby tires and a million gears, all unnecessary for flat city riding

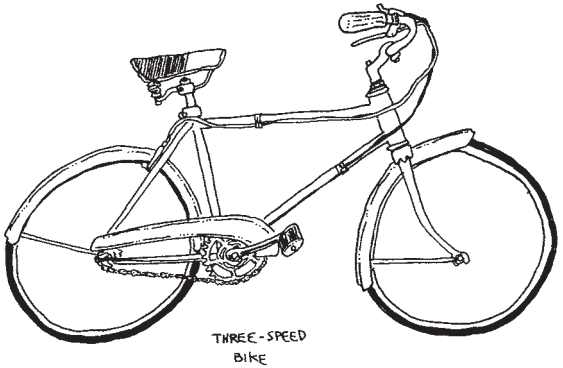
2) Too small!: the sales people at those places don't know much about fitting bikes, it seems



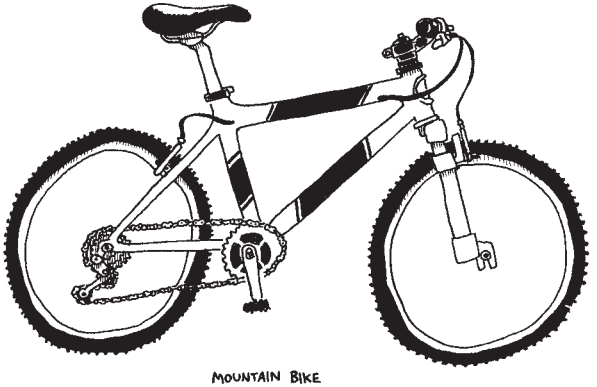
CRUISER
(THIS ONE HAS
A GIRL'S FRAME)



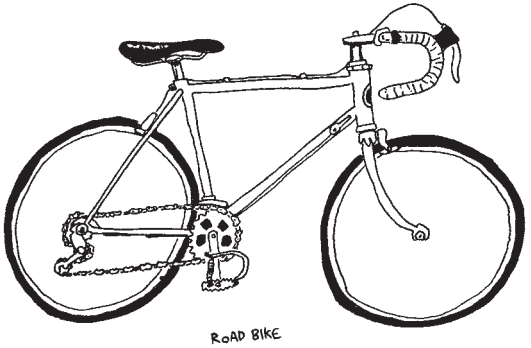
ONE-SPEED ROAD BIKE



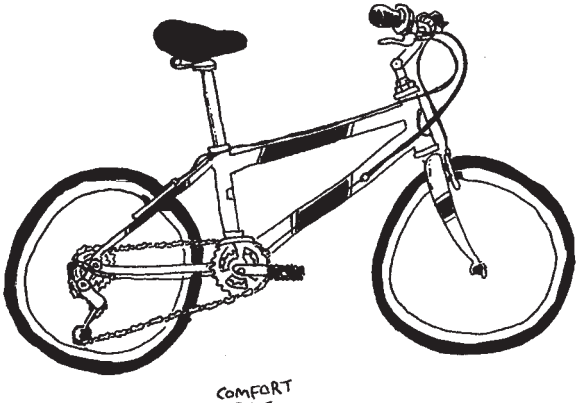
THREE-SPEED
BIKE



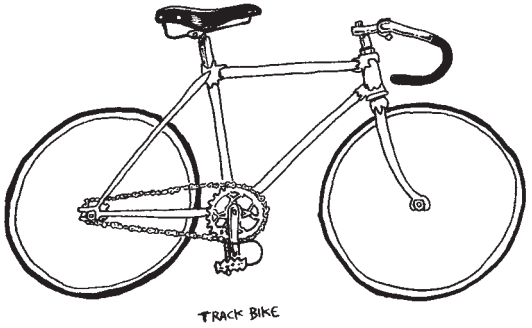
MOUNTAIN BIKE



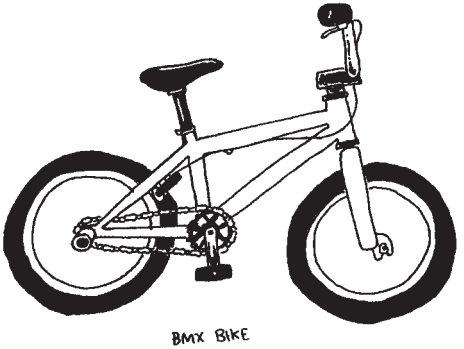
ROAD BIKE



COMFORT
BIKE



TRACK BIKE



BMX BIKE

3) Assembled poorly: They might have scored a new $89.95 bike, but paid another 40 bucks right off to get the thing running"properly" (which is never too impressive on one of those). Worse, because they don't come with maintenance plans like our bikes did (one year free tune-up and warranty!).

4) Annoying: The things fell apart right away due to inferior components like crappy shifters, and (gasp!) plastic crank arms!

5) Somehow these pieces of junk are made of, like, recycled bowling balls or something and weigh a million-zillion pounds.

While our business went up in annoying and time consuming repairs, our sales business plummeted cause somehow these folks thought they were getting a deal buying janky bikes for cheap! So we made less money and did repairs on "*NEXT...*" brand bikes all day. Anyhow, when our rent went up, the boss told me he didn't have the energy to keep fixing Wal-Mart bikes the rest of his life and we closed. So guess what? Fuck Wal-Mart. I really dislike that place, and most out-of-town, big corporate conglomerations like them. They killed our business. Just like people say, these places really, really, really do put good businesses out by selling cheap and inferior shit; just like those "Wal-Mart—proud to kill your home" bumper stickers (modeled on the ubiquitous, "New Orleans—proud to call it home"). I hope you understand why you should find a good local bicycle shop and support them, if at all possible. It's good for you and it's good for them, and in the long run, it's bad for big dumb corporations like Wal-Mart. Good.

As with any bike, treat it as well as you would any other bike, learn to work on it and be happy with it! Bikes rule! Ok! Here we go!!!

tools you will need:

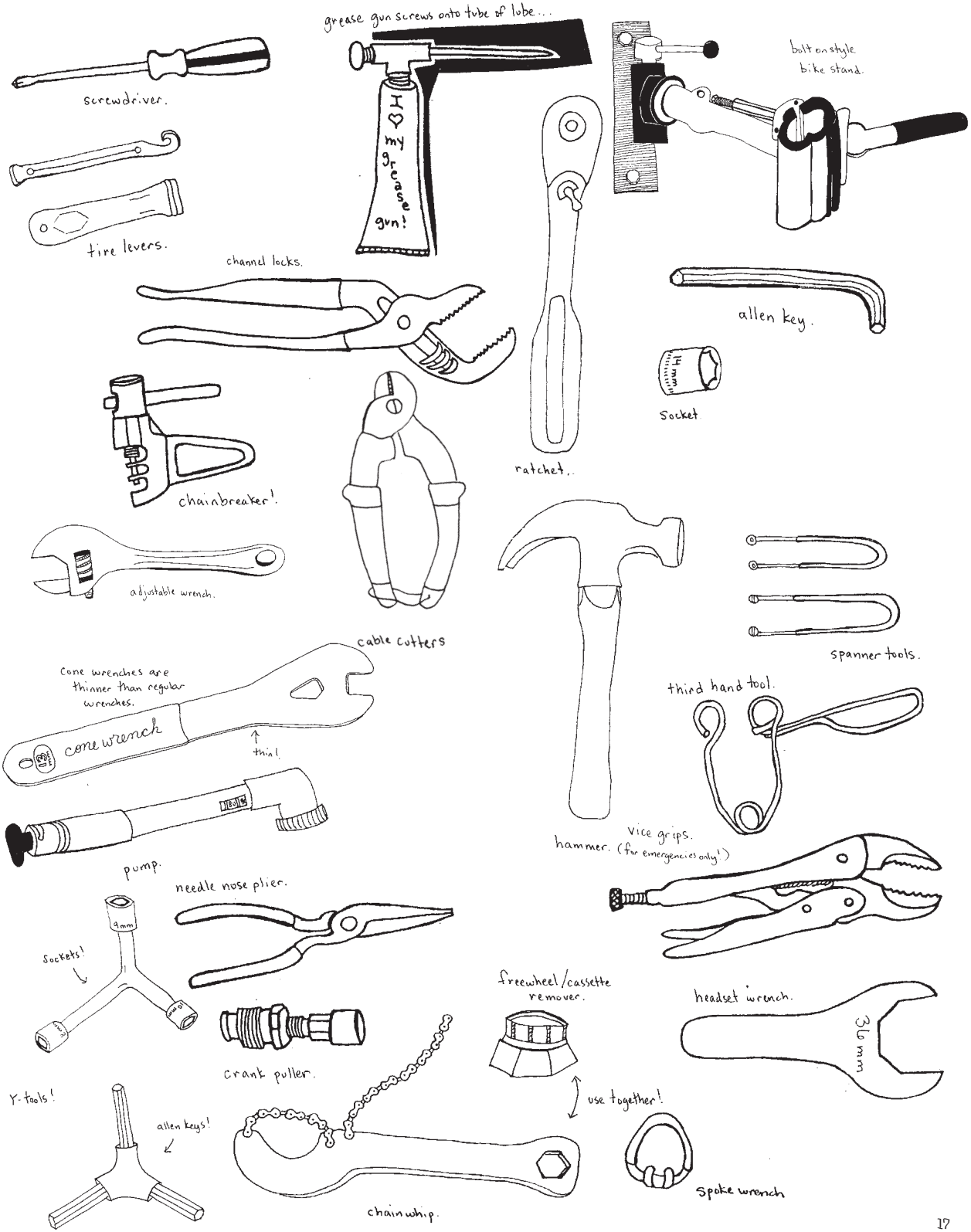
A good place to start is with the tools you need. We made a list here of tools that are necessary to do the repairs in this book. Some tools are indispensable, so you should have your own. Others you will use once in a blue moon, and really, you needn't buy it. Instead, borrow it from a friend, a local free bike project (listed in the back of this book!), or from a nice local bike shop who will let you loosen something with their tool without charging you three dollars like one of our local shops does. So check these out and build yourself a tool kit:

Note: A lot of these tools may not be necessary for your bike type. There may even be sizes of tools listed that you will not need for your bike. Find out what sizes of things like wrenches and spoke tools for your bike during your first tune up and build your tool kit accordingly. That way you don't get stuff you don't need.

essential tools:

These tools are always nice to have and once you have them, you will find yourself using them more and more. If you want to do any minor repairs on your bike or other people's bikes, invest in them, you'll be happy you did...

- **Screwdrivers**: At least a small and medium size of each a flat and a Phillips
- **Tire levers:** Two, the flat black kind are my favorite!
- **Adjustable wrench (crescent wrench):** Medium size, though a small one and a large one are helpful too.
- **Allen wrenches:** A set, or at least 4, 5, 6 millimeter sizes and any special to your bicycle. Tri-tools are the best! -
- **Cone wrenches:** (13, 14, 15, 17 millimeters, or special to your bike)
- **Chainbreaker!** (The tool AND the book! Ha ha)
- **Bicycle pump!** (And a Presta valve adapter if you need one or your pump is not equipped).
- **Wrenches:** Especially 8, 9, 10 and 13, 15, 17 millimeters. The smaller ones are necessary for derailleurs and brakes. Most bikes use metric wrenches (as opposed to standards). The exception to this are old Schwinns, so be careful to check. The size of the wrenches will be stamped into the side of the wrench.
- **Sockets (or a tri-socket tool, which we love!):** 8, 9, 10, 14, 15 millimeters are good ones, but 14 is the only one really necessary (if you have three piece cranks).
- **Ratchet for sockets:** Make sure you get the right drive ratchet (3/8") to match the sockets you have. You can get a cheap socket and ratchet set with all the sizes you need at a hardware store (anindependent one), or at a yard sale if you're lucky!
- **Needle-nose pliers**


screwdriver.
tire levers.
grease gun screws onto tube of lube...
I ♡ my grease gun!
bolt on style bike stand.
channel locks.
allen key.
ratchet.
socket
chainbreaker!
adjustable wrench.
cable cutters
spanner tools.
third hand tool.
Cone wrenches are thinner than regular wrenches.
cone wrench
thin!
pump.
hammer.
vice grips. (for emergencies only!)
needle nose plier.
sockets!
crank puller.
freewheel/cassette remover.
use together!
headset wrench.
Y-tools!
allen keys!
chain whip.
spoke wrench

• **Channel locks:** Helpful in lots of places and can replace other tools in a pinch (for example, you can use 'em in place of a proper headset wrench).
• **Cable Cutters:** You can get bicycle cable cutters from bike tool makers like Pedro's, Shimano, Jagwire, or Park Tools from a bike shop. Most regular wire cutters won't work.
• **A little hammer:** Having one helps you resist the desire to use a delicate tool to really whack something with.

good tools to have:

These are great tools to have if you want to make bike repair a serious part of your life, or if you are dedicated even to doing all of the work on your personal bike. If you only plan to do the occasional tune-up, and you know someone who has these tools, borrow them instead!

• **Spoke wrenches:** To fit your wheel's' spokes.
• **Headset wrench:** To fit your bike.
• **Brake adjusting wrench:** This is thin like a cone wrench. 10mm for a caliper brake adjusting nut.
• **Crank puller**
• **Chain whip and freewheel or cassette removing tool:** To fit your size.
• **Spanner tool:** For your bottom bracket type.
• **Vice Grips:** For emergency situations only!!!
• **Bottom bracket tool:** Appropriate size that fits your bike if you need one (for three-piece style bottom brackets).
• **Grease Guns are the best!!!**
• **Third hand tool:** Brake holder thing.
• **A Bike Stand:** This is not essential, but it makes all your work (especially on bikes with gears) a whole lot easier. You can usually find one for about a hundred bucks. We recommend the arm type that bolts to a stand or a wall over the collapsible kind, with the wobbly legs. They are about the same price, but the bolt-on kind has a better quality clamp.
• **Wheel truing stand:** These aren't cheap, but if you want to work on your wheels or learn to build wheels, they are indispensable.

caring for your tools:

Try to keep your bike repair tools separate from the rest of your tools. I have separate boxes for bike repair, auto repair and wood working stuff. You should be able to fit all your bike tools in one small toolbox or bag.

Keep your tools clean and wipe them down after you use them. Respect your tools and they will serve you well. By all means, lend your tools out, but don't be afraid to make it clear that you expect them to return to you. It's better to be honest about that and always be the one to have the tools to lend. Also, asking people to respect your shit reminds them to respect their own. Don't feel bad. Putting your name on 'em feels dorky, but is good, especially in the punk house where more and more junk is getting brought home every day. I guess this would work with lots of things!

Get good tools. Go for Park Tools, Pedro's, and fancier stuff. If a shop doesn't carry tools, they more than likely will order them for you, and if you're real nice, they won't double the catalog price on you. As for wrenches, screwdrivers, etc, get good quality stuff. It will last you longer and often comes with a warranty that will replace something that breaks.

a word on bike stands!

I think I got really spoiled working on bikes in a shop all of the time. I mean, I learned to fix bikes in a shop with the bike clamped onto a stand and never really realized the difficulties of working without one until I started fixing bikes at home. It didn't take me long to go ahead and invest in a good stand. With one of these, you can clamp your bike down steady and flip it around into any conceivable position. Because the wheels are suspended, you can turn the crank, making brake adjustments and gear adjustments insanely easier. I mean, it's so much less frustrating than trying to keep a bike sitting upside down from falling over while you stretch to try to shift the gears while the bike is resting on the shifter mechanism. Argh! It sucks! There are a lot of different kinds of stands one can purchase or make. There are the fold-up, portable kind, or big clunky heavy ones that come with a stand and base, and there are the kind that clamp onto a table or wall. I went with the wall clamp one because you can get the higher quality clamp for much less. Most of the ones I have seen are Park Tools brand and I think that they are great. The fold-ups are a little wonky for my taste, and when comparing different models of different stands, I definitely prefer the all-metal

clamp option. A shop will more than likely let you look at a catalog to choose one and even order one for you. They aren't cheap, but if you have a bike with gears, it won't take you long to wish you had one. So, if you are going to make bike fixing a habit, invest in a good stand, or look around for some nice directions on making a stand of your own. I've often thought that in a pinch, you could figure out how to rig up a car-mount bike rack to work, but I'll leave working out the details on that one for your creative mind....

tune-up instructions:

These tune-up instructions are meant to be done in the order they are written. This will help you avoid unnecessary steps, like taking the wheels on and off a gazillion times, or flipping the bike over and over. You might find you can skip steps, but still try to follow the directions in a linear way, or come up with a system that works best for you.

We have covered the main types of bikes and parts you will see. Occasionally you will run across something totally wild looking, like roller cam brakes or something wack like that. Don't panic! Really! Find the part description which most closely resembles yours and use logic to figure it out. Many parts function quite similarly even if they look different. Try your best to figure it out. It will make you a better mechanic in the long run.

tune-up order:

1. Inspection
2. Wheels:
    A. Axles
    B. Truing
    C. Tires and tubes
3. Brakes
4. Shifters and derailleurs
5. Bearing systems
    A. Headset
    B. Bottom bracket
6. Drivetrain
    A. Chain
    B. Cassettes and freewheels
    C. Cranks and chainrings
7. Check all nuts and bolts
8. Safety check

inspection:

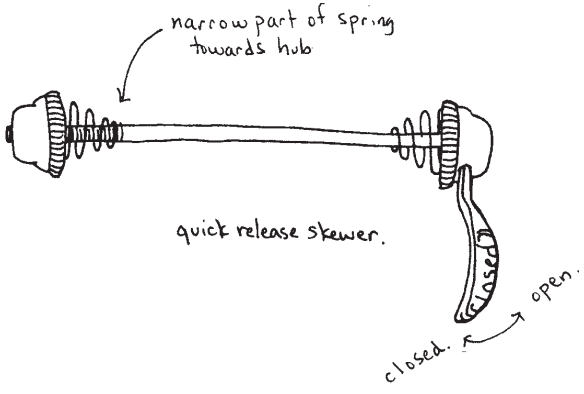
Before you even start, INSPECT your bicycle! Check the frame for breaks or cracks. (Do this even if the bike is new to you. There is nothing worse than doing a whole tune-up on a bike and then realizing the frame is busted.) Note items that need replacing, adjustment, repair or overhaul. Get an overall sense of the bike and how much work is worth putting into it, and what parts you will need to make the tune-up really nice.

Your question is to find out, is it worth it? If your bike has wheels that are totally jacked, bad hubs, broken spokes, warped like crazy, and has busted derailleurs, it might not make sense to fix it up. Think about the cost of new parts before you start. If you have a recycled-bike project near you, it might still be feasible for your budget. Look at what your budget is and compare it honestly to the work you need to do. Remember, while adjustments are free, overhauls and replacements add up.

DECIDING TO ADJUST OR OVERHAUL

Overhaul vs. adjustment: The distinction is very important. This is the difference in how far you want to go with a bike repair and how much time you have to do it. An adjustment usually entails nothing more than some tightening or loosening of parts and nuts and bolts to make something run smoothly. This might also involve your great grease gun, but usually no more extensive than that. An overhaul is a complete disassembly, assessment, cleaning or possible replacing of parts, and, finally, reassembly. This can take time and a lot of patience, and more than likely a trip to the bike shop. It is almost always worth the effort though, and is absolutely necessary if you have worn or broken parts (look for extreme rust or metal falling loose out of open axles, headsets or bottom brackets especially – this means overhaul time!) Adjustments and overhauls will be explained for most repairs in this book.

OK! TIME TO START YER TUNE UP!



wheels:

REMOVE THE FRONT AND REAR WHEELS.

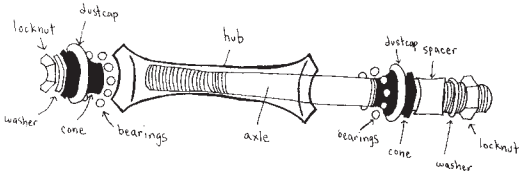
There are two ways your wheels connect to the bike: with axle nuts or with quick releases skewers.

AXLE NUTS.

Axles nuts screw onto a solid axle to hold the wheel on. If you have axle nuts, chances are they are 15mm nuts, but could also be something totally random and unusual. Use the proper wrench for the nut, or use an adjustable wrench if you have to and loosen the nuts (clockwise to tighten, counter clockwise to loosen). Take the wheel off. Put the wheel back on in reverse order, making sure to get the wheel even in the forks or chainstays, and with rear wheels, to get your chain around the rear cogs. Bolt back down securely.

QUICK RELEASE.

A quick release skewer is a long thin rod that runs through a hollow axle with nuts screwed onto the end. One of these nuts has an arm that when flipped down squeezes the two nuts together to hold your wheel on. If you have quick releases, flip the lever on the skewer up to loosen the wheel. This lever usually has a little curve to it. When the curve points away from the wheel it is loosened, towards the wheel is tight. The lever might even say "open" when it is opened, and "closed" when it is closed. Pull the wheel off when it is opened. To resecure the wheel to your bike put the axle in the dropouts, make sure the wheel is centered evenly between the forks or chainstays, and then turn the nut on the side of the skewer that has no lever. Turn this until the wheel is just barely snug, then flip the lever closed. It should feel slightly tight to get this lever all the way



axle parts.

down. If not, readjust the nut opposite the lever until your wheel is on well.

PUTTING A REAR WHEEL WITH GEARS BACK ON.

When putting any rear wheel on, one must be sure to get the chain around the rear cogs. With single-speeds, this is fairly easy, but with multi-speeds it can be a little trickier. First, make sure the rear gear is in the highest (smallest) gear. Pull the bottom part of the rear derailleur towards the rear of the bike. Then put the smallest gear under the top half of the loop of chain then pull the axle back into the dropout. This is especially confusing if the bike is upside down, in which case you pull the top-most part of the rear derailleur back toward the rear of the bike. Place the smallest gear on top of the bottom half of the loop of the chain and then pull the axle back into the dropout. The chain should be wrapped around the rear cogs and then form a backwards S-shape as it passes through the jockey wheels on the derailleur. When this looks right, bolt the wheel back on. Turn the cranks to make sure everything is working correctly. Re-do if necessary. If you are new at this, play around with it a little and practice so you don't get stuck somewhere weird someday.

inspect wheels:

Inspect your wheels and get a quick overview of the work that you are going to do. Check for straightness by spinning the wheels and looking to see how straight the rim looks. While the wheel is spinning also check the axles for smoothness. You don't want to hear grinding or other noisescoming from the hub. Check your tire pressure to discern if you might have holes in tires or tubes. Check that axle nuts or quick releases work well and are not stripped. Take note if you have any broken or really loose spokes.

To completely adjust or overhaul your wheel, follow these steps.

axles:

Though the axles are a bearing system and really could go in that section, we will adjust or overhaul the axles now because it makes the most sense to get the wheels taken care of first. You can't true your wheel with the axles all wobbly, and you can't adjust your brakes without the wheel trued. For more in-depth understanding of bearings and bearing systems, you could skip forward to the Bearing Systems section of this book, and then come back here and get on with the axles.

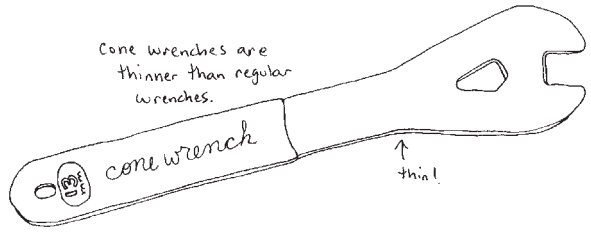
Note: There is a special tool used for axle adjustments and overhauls: the cone wrench. This is very similar to a regular wrench, except that it is very thin. It fits into slots on the adjusting cones on your axle. It is nearly impossible to make a good adjustment without the cone wrenches that fit your wheel. They are available for sale at most bicycle shops, often in combo sizes, a different one on each side of the wrench.

The wheel includes the rims, tires, tubes, spokes, and hubs. The rims are what the tire and tube rest on, and the spokes hold the rim to the hub. The hub is where all the action happens. It is worth taking one apart just to see and understand this! The hub is basically like two cups that rest facing away from each other, much like the cups in a headset or a one-piece bottom bracket. Inside these cups are bearings, and running through the two hubs is one long axle where the cups sit. The bearings are squashed between the cups and the cones, and they're rolling on this very smooth, clean track—this is what allows your bike to roll. The person who invented the wheel might have been smart, but the bearing took it to another level.

As with all bearing systems, the hubs can either be adjusted or overhauled. An adjustment is simply relieving excess tightness or (more likely) looseness out of the axle, allowing it to run smoothly in the hub without being wobbly. An overhaul is a complete dis-mantling of your axle, cleaning or replacement of worn parts, and re-assembly.

If your hub is too loose, you will feel the wheel wobbling on the frame, as if the wheel isn't bolted on well (make sure it is).

On the other hand, the axle might feel tight, causing the wheel to spin sluggishly. Test this by lifting your bike and spinning the wheel forward. If it slows down real fast (and



nothing is rubbing) your hub is too tight and you need to adjust it.

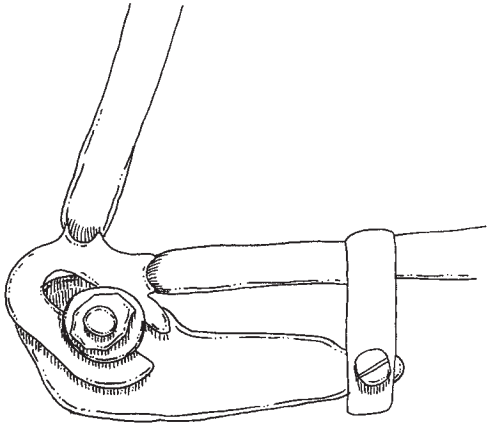
How do you know if your hub needs an overhaul? You will more than likely hear some loud and random knocking coming from the hub area while you are riding. If you hear grinding or notice an excessive amount of looseness in the hub, or you see little bearings or chunks of metal falling out, then it is time for an overhaul.

So decide what you want or need to do, then lets go!

adjustment:

Start first with taking the wheel off of the bike. If it is a bolt-on wheel, loosen the bolts on both sides of the wheel and pull the wheel off. If you have a rear coaster wheel, you will also need to remove the nut from the brake arm and release that brake arm from the brake arm strap and set the bolt aside. Don't lose it! If it is a quick release, loosen the skewer by lifting the lever and then pull the wheel off. Now, take a look at your axle, which goes through the hub of your wheel. The axle is what we want to adjust. All axles (except sealed bearing axles which we won't discuss in this book) are set up relatively the same. On each end of the axle you'll have a locknut, some washers or spacers, a cone, and some bearings. Sometimes there is a bearing cover or dust cover (which protects the bearings from dirt) attached to the cone or stuck in the inner part of the hub, holding your bearings safely in place. They pretty much all work/look like this*. (Look at the picture.)

Note: The exception that I can think of is on some old cruisers and three speeds. These sometimes have front wheels with a smaller diameter axle and cones without locknuts. These axles are slightly ribbed around the area where the cones sit and this ribbing holds the cone in adjustment, in theory at least. If you have these (usually they take a 13mm cone wrench), simply follow the steps of



THE COASTER BRAKE ARM STRAP KEEPS THE HUB FROM UNSCREWING ITSELF WHEN YOU ARE BRAKING.

the adjustment or overhaul minus the locking and unlocking of the locknut.

Okay. The first thing you want to do is choose a side of the wheel to work on. Either side is fine, unless you are working on a rear wheel with cogs on it. If you are, you can choose to make the adjustment without removing the cogs (leaving out the step of greasing one side of the axle) or you can skip to the freewheel or cassette removing section of the book, remove the part and proceed. If you have a rear coaster wheel, simply choose the side that does not have that tricky little brake arm.

Now take out your wrenches (you will more than likely use a 13, 15 or 17) and your cone wrenches (again 13, 15 or 17). Put the wrench on the outside locknut, and your thinner cone wrench on the shallower grooves of the inside cone. These two nuts are "locked together" so that neither of them can move,therefore keeping the axle properly adjusted. To unlock them, hold the cone wrench still with one hand and loosen the locknut with the other, turning the locknut counter clockwise. Be careful not to open it so much that your bearings fall out!

Now the nuts are loose. It is good (but not essential) to shoot a little grease into the hub at this point. Loosen the locknut and the cone enough to cram a little grease in underneath the cone there (this is easy if you have a pointy grease gun), but not so loose that bearings are able to fall out. These bearings are pretty small, so open it a little crack, making sure that the cone on the side of the hub that you are not working on is still snug against the bearings. The easiest way to do this is by working on your wheel while it is sitting on the table, with the axle pushing into the table, keeping the gap on the topside of the wheel. Once the grease is in that side, carefully flip the wheel over and shoot or shove some grease in the other side of the hub. Carefully flip it over again, back to the side with the loose nuts, and now you can move on to adjusting the axle.

Working with the unlocked cones and locknut, tighten the cone downtowards the hub. (Note: Make sure that all the bearings are in line. Sometimes one will hop up and stack onto others, making the cone seem either way too high above the bearing ring or the bearing ring way too high above the hub. If this is happening you will either feel a lot of play or uneven tightness in the hub. Loosen it and push the bearings down with something pointy like a spoke or a flat head screwdriver, and then start again.) Tighten the cone until you feel it bottom out against the bearings very, very gently. Now, push the washers or spacers back down against the cone, and then tighten the locknut down until it bottoms out against the cone.